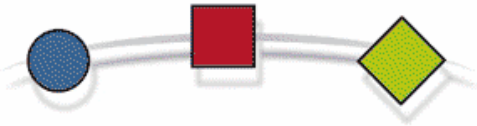


Scitor Enterprises, Inc.



Commercial Aviation Mobile Datalink Communication Decision Choices

**Meeting Commercial Air Travel Stakeholders'
Expected Value**

Workshop on Integrated CNS Technologies for
Advanced Future Air Transportation Systems

May 2, 2001

Paul Mallasch

Brian Lewis

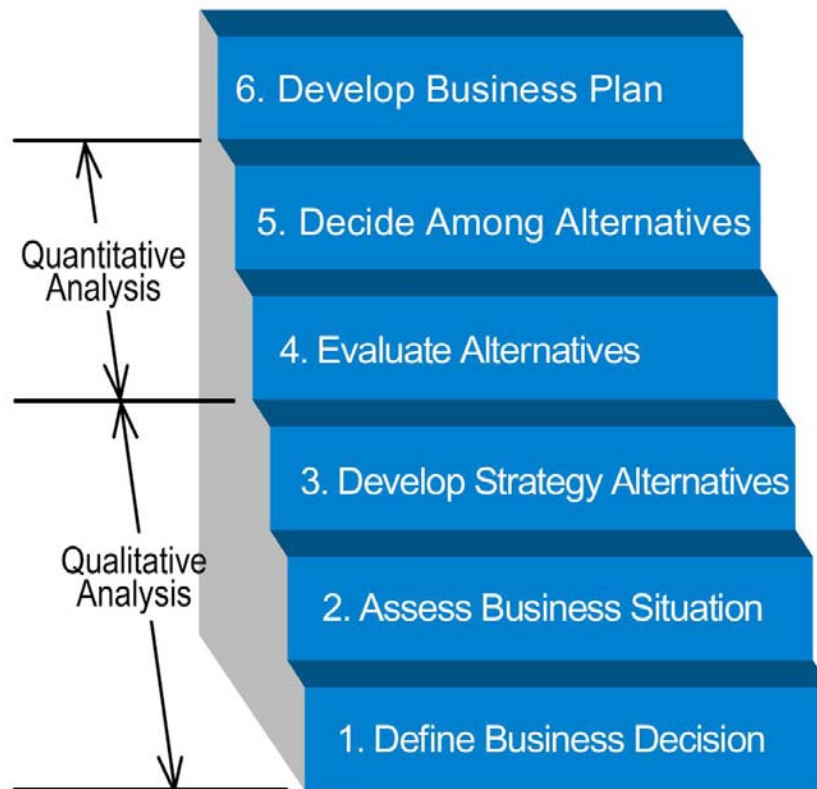
Ken Smith

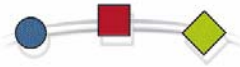




Overview

- **A qualitative & quantitative process to evaluate potential mobile datalink communication systems**

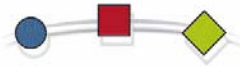




Strategic Objective (Qualitative)

1. Define business decision

- Understand commercial aviation mobile datalink communication stakeholders expected value & risks
 - ⇒ Meeting near-term needs & a transition to long term global ATM solutions
- Stakeholders to satisfy the business solution
 - ⇒ Airlines & general aviation
 - ⇒ NAS & airport agencies
 - ⇒ Manufactures & suppliers
 - ⇒ Service providers
 - ⇒ Passengers, public & air cargo
- Alternative solutions must consider
 - ⇒ Technology
 - ⇒ Policy
 - ⇒ Procedures
 - ⇒ Infrastructure
- Evaluate impact of solutions on
 - ⇒ Safety
 - ⇒ Capacity/efficiency
 - ⇒ **Economic benefit (value & cost to stakeholders)**
 - ⇒ NAS system modernization effectiveness



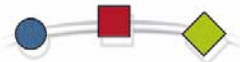
Strategic Questions (Qualitative)

2. Assess business situation

Identifying key stakeholder's
high-level criteria or issues

Questions leading to viable
datalink alternatives:

- What type of datalink communication system?
- What services does datalink system provide?
- What is the operational spectrum?
- What is the spectrum capacity to meet future communication market demand?
- The date the datalink system can be operational?
- How does aircraft navigation system integrate with datalink system?
- How does aircraft surveillance system integrate with datalink system?
- What aircraft equipment is required?



Strategy Table (Qualitative)

3. Develop strategy alternatives

Decisions → Decision Choices ↘	What type of data link communication system?	What services does data link system provide?	What is the operational spectrum?	What is the spectrum capacity to meet future communication market demand?	Date data link system can be operational?	How does aircraft navigation system integrate with Data link system?	How does aircraft surveillance system integrate with Data link system?	What aircraft equipment is required?
	ACARS	FIS	VHF		Now	None	None	None
	VDL-2	TIS	Ka		2005	GPS	ADS	Minor Avionics Upgrade
	VDL-3	CPDLC	Ku		2007	LAAS	Advanced Satellite	Major Avionics Upgrade
	VDL-4	DSSDL	L		2010	WAAS		
	Mode S	AOCDL	HF		2012	Enhanced GPS		
	UAT	AUTOMET			2015			
	SATCOM	APAXS			2020			
	HFDL	ADS-B						



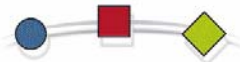
Defining Alternatives (Qualitative)

3. Develop strategy alternatives

- **Alternatives meeting the overall stakeholder objectives**
⇒ **Based on stakeholder values & business case**

Example strategy alternatives:

- Near term minimum stakeholder cost
- Implement NAS 4.0++ datalink (e.g. transition to satellite)
- Maximize stakeholders value datalink capability
- Global satellite focused datalink



Strategy Alternative (Qualitative)

3. Develop strategy alternatives

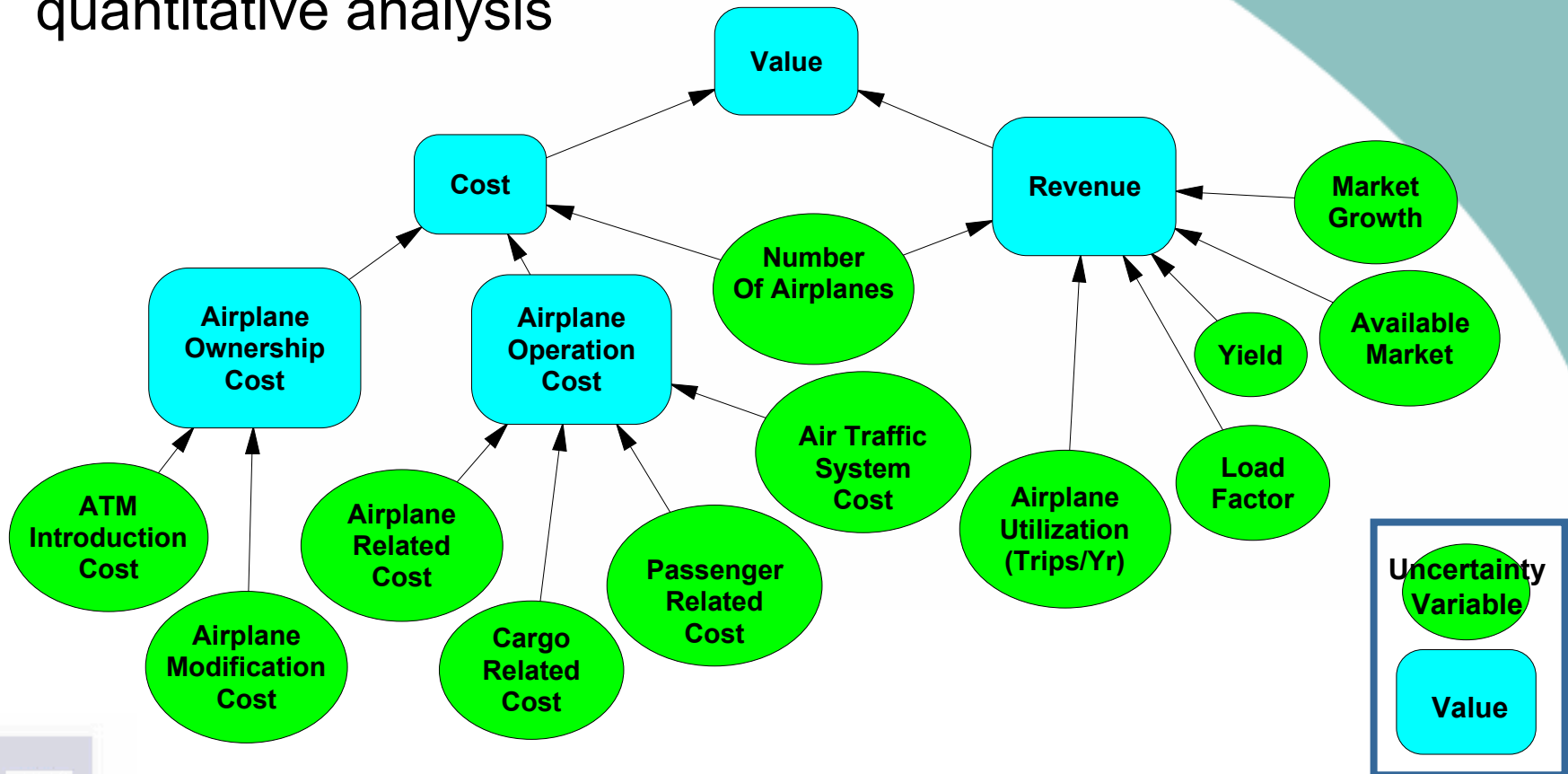
- “Near term minimum stakeholder cost” alternative

Decisions → Decision Choices ↘	What type of data link communication system?	What services does data link system provide?	What is the operational spectrum?	What is the spectrum capacity to meet future communication market demand?	Date data link system can be operational?	How does aircraft navigation system integrate with Data link system?	How does aircraft surveillance system integrate with Data link system?	What aircraft equipment is required?
<u>Near term minimum stakeholder cost</u>	ACARS	FIS	<u>VHF</u>		Now	None	None	None
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	UAT	AUTOMET			2015			
	SATCOM	APAXS			2020			
	<u>HFDL</u>	<u>ADS</u>						



Assessing Airline Value (Example)

- Transition from 3 to 4
- Base-case influence diagram links qualitative strategy with quantitative analysis



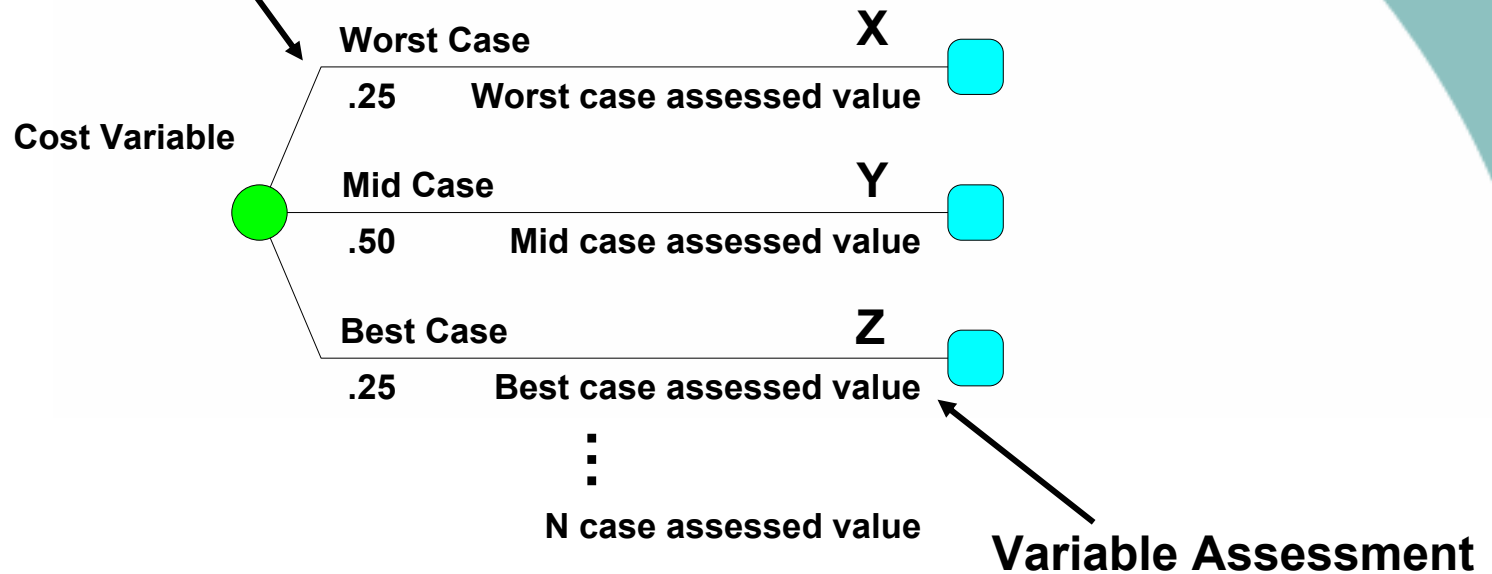


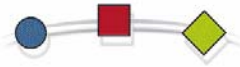
Decision Tree (Quantitative)

4. Evaluate alternatives

- Assesses value & risk of uncertainty variables

Probability of event occurring (Risk Assessment)





Tornado Diagram (Quantitative)

4. Evaluate alternatives

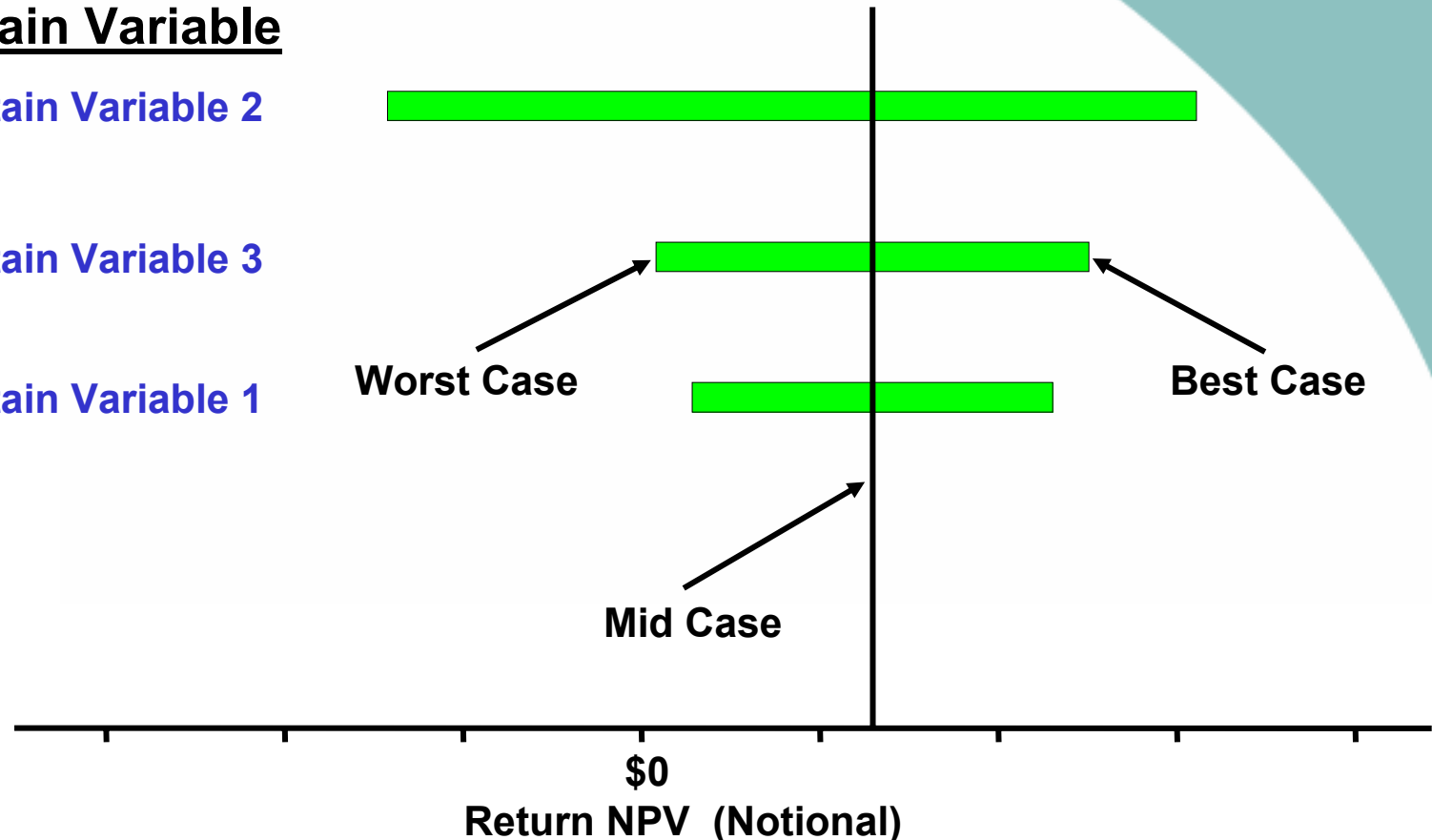
- Identifies uncertainty variables sensitivity

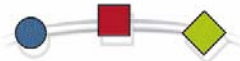
Uncertain Variable

Uncertain Variable 2

Uncertain Variable 3

Uncertain Variable 1

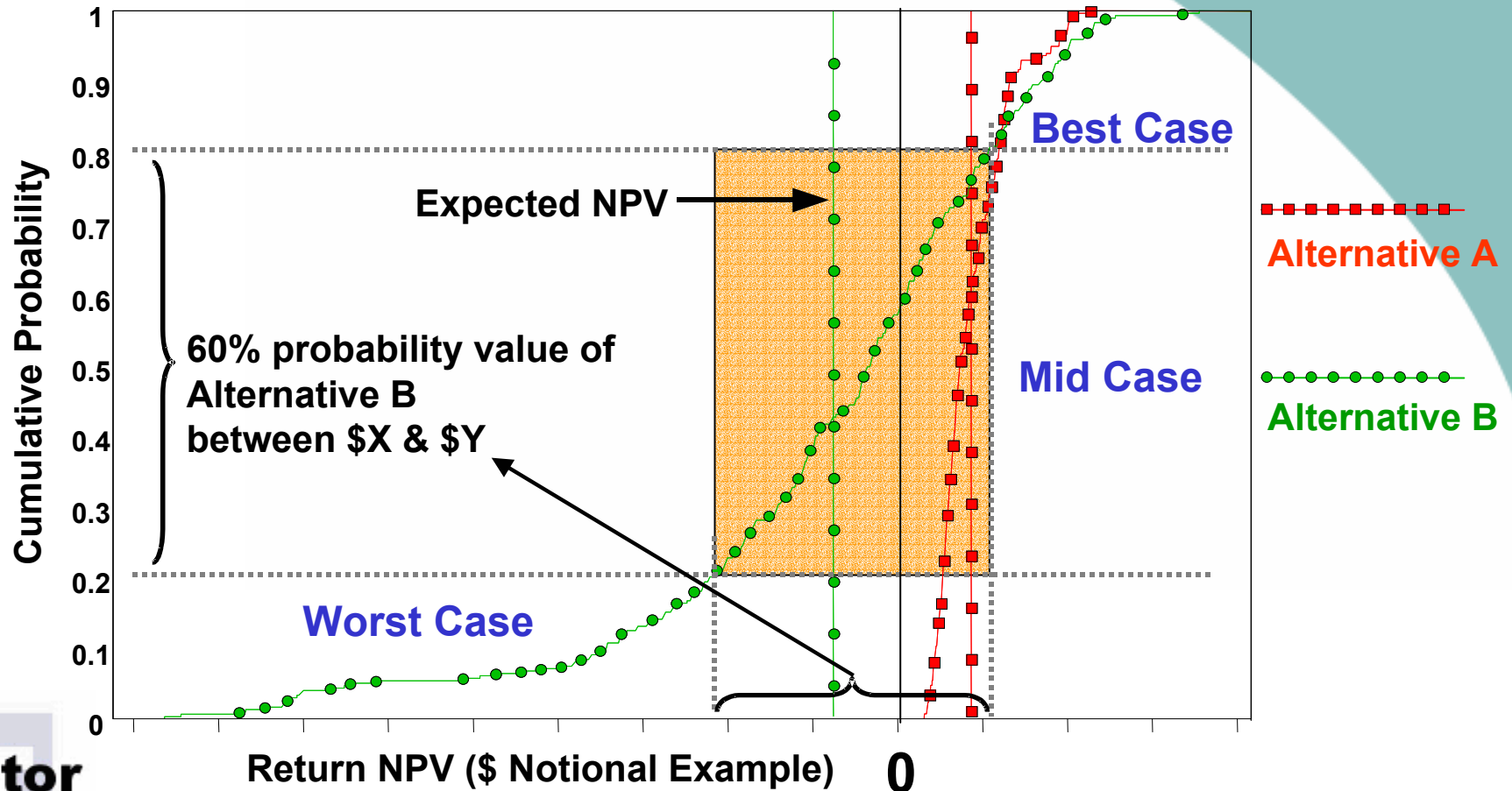


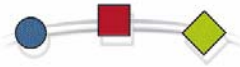


Risk vs. Return (Quantitative)

5. Decide among alternatives

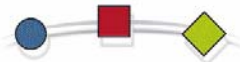
- Provide decision makers with trends, insight, etc.



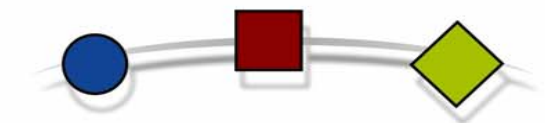


Benefits

- Build stakeholder confidence in a decision
- Rational decision-making in a disciplined manner
- Collaborative process
 - ⇒ Decision makers, stakeholders, & project teams focus on the “goal”
- Maximize value/minimize cost (short & long-term)
- Business unit accountability
- Enables development & implementation of realistic business plans



Step Summary



**Scitor will guide
Business Decision Makers
through a value-focused
qualitative and quantitative
decision analysis process**



Define Business Decision

- * Clearly define fundamental objectives and business decisions.
- * Assure commitment by decision makers.



Assess Business Situation

- * Define internal and external issues such as decisions, uncertainties, facts, values, and objectives.



Develop Strategy Alternatives

- * Develop broad range of alternative strategies, identify key decisions, tradeoffs, and uncertainties.
- * Ensure that the decision maker's values are clearly defined and reflected in strategy alternatives.



Evaluate Alternatives

- * Complete comprehensive analysis focusing on critical issues providing insight into risk, value, cost, and benefits.



Decide Among Alternatives

- * Compare risk and value for each strategy alternative.
- * Provide decision makers with trends, insight, and best recommended decision opportunities.



Develop Business Plan

Decision trends, insights, and recommendations result in maximum value strategic business plan development and implementation including plan, schedule, budget, organization, and contingency plans.